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# Department of Pesticide Regulation



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## MEMORANDUM

TO: Chuck Andrews, Branch Chief  
Worker Health and Safety Branch **HSM-00016**

FROM: Sally Powell, Senior Environmental Research Scientist *[original signed by S. Powell]*  
Worker Health and Safety Branch  
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DATE: November 13, 2000

SUBJECT: ACUTE EXPOSURE VALUES FOR TREE AND VINE APPLICATIONS OF  
1,3-DICHLOROPROPENE WITH REDUCED BUFFER ZONE

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This memo gives the acute exposure estimates needed by the Medical Toxicology Branch to evaluate potential risk from a proposed reduction in buffer zone for tree and vine applications of 1,3-dichloropropene (1,3-D) from 300 to 100 feet. Acute exposure is represented as the 24-hour average inhalation dose of 1,3-D experienced by adults and children at distances of 100 to 1000 feet from treated fields of seven different sizes. These values are given in Table 1. The calculation of acute exposure is described in the following.

Approach Acute exposure was calculated by the same method as in the Risk Characterization Document for 1,3-D. Although seasonal and lifetime exposures were estimated probabilistically in the RCD, acute exposure was estimated deterministically because the distributions of exposure factors used to estimate seasonal and lifetime exposures were not considered appropriate for 24-hour estimates. Point-value (or “deterministic”) estimates of acute exposure were calculated as:

$$\text{Exposure (mg/kg/day)} = \text{Air Concentration (mg/m}^3\text{)} \times \text{Breathing Rate (m}^3\text{/kg body wt/day)}.$$

Air concentrations From the data produced by modeling 20 years of 1,3-D air concentrations (Cryer and van Wesenbeeck, 2000), Cryer and van Wesenbeeck (undated) extracted all air concentrations for the 24-hour periods beginning 2 and 3 days following applications, for the receptors located 100 to 1000 feet (in 100-ft increments) from treated fields. Appendix E of the undated report gives the frequency distribution of these concentrations for each distance, treated field size and time delay (2 or 3 days). In conformance with WHS Branch practice, I used the 95<sup>th</sup> percentile air concentration for each distance and field size. In each case, I used the greater of the concentrations after two days and three days. The 95<sup>th</sup> percentile air concentrations are shown in Table 2.

Breathing rates The same breathing rates were used as in the RCD, 0.46 m<sup>3</sup>/kg body wt/day for children, and 0.26 m<sup>3</sup>/kg body wt/day for adults.

Uptake/absorption One-hundred percent uptake/absorption was assumed.



*References*

- Cryer, S.A. and I.J. van Wesenbeeck. 2000. Predicted township wide air concentrations of 1,3-dichloropropene resulting from tree and vine applications in California. Dow AgroSciences Llc. Indianapolis, Indiana. GH-C 5067.
- Cryer, S.A. and I.J. van Wesenbeeck. Undated. Spatial and temporal distribution of township air concentrations of 1,3-dichloropropene resulting from treated fields in the California tree and vine market. Dow AgroSciences Llc. Indianapolis, Indiana. GH-C 5110.

cc: Ruby Reed, Jim Sanborn, Bruce Johnson

**Table 1. Acute exposure: 24-hr average inhaled dose (mg/kg/d)**

Field size (ac)	Distance from field (ft)									
	100	200	300	400	500	600	700	800	900	1000
<b>Children</b>										
74.4	0.180	0.148	0.124	0.108	0.094	0.083	0.073	0.065	0.059	0.054
58.5	0.192	0.149	0.125	0.104	0.089	0.080	0.072	0.065	0.058	0.053
38.3	0.139	0.111	0.092	0.075	0.064	0.055	0.046	0.040	0.037	0.033
27.8	0.144	0.109	0.087	0.074	0.062	0.055	0.047	0.042	0.037	0.033
18.6 a	0.122	0.094	0.074	0.061	0.051	0.043	0.037	0.033	0.029	0.025
18.6 b	0.122	0.095	0.075	0.063	0.053	0.044	0.038	0.032	0.029	0.025
11.3 a	0.104	0.080	0.062	0.051	0.041	0.034	0.029	0.026	0.023	0.020
11.3 b	0.116	0.089	0.065	0.049	0.040	0.034	0.028	0.024	0.021	0.017
5.74 a	0.069	0.050	0.038	0.027	0.021	0.018	0.015	0.013	0.012	0.010
5.74 b	0.067	0.050	0.037	0.027	0.022	0.018	0.015	0.013	0.011	0.010
<b>Adults</b>										
74.4	0.102	0.084	0.070	0.061	0.053	0.047	0.041	0.037	0.033	0.030
58.5	0.108	0.084	0.070	0.059	0.050	0.045	0.041	0.037	0.033	0.030
38.3	0.079	0.063	0.052	0.043	0.036	0.031	0.026	0.023	0.021	0.019
27.8	0.081	0.061	0.049	0.042	0.035	0.031	0.027	0.024	0.021	0.019
18.6 a	0.069	0.053	0.042	0.034	0.029	0.024	0.021	0.019	0.016	0.014
18.6 b	0.069	0.054	0.043	0.035	0.030	0.025	0.021	0.018	0.016	0.014
11.3 a	0.059	0.045	0.035	0.029	0.023	0.019	0.016	0.014	0.013	0.011
11.3 b	0.065	0.050	0.036	0.028	0.022	0.019	0.016	0.013	0.012	0.010
5.74 a	0.039	0.028	0.022	0.015	0.012	0.010	0.009	0.008	0.007	0.006
5.74 b	0.038	0.028	0.021	0.016	0.012	0.010	0.008	0.007	0.006	0.006

**Table 2. 95th percentile 24-hr air concentrations (ug/m<sup>3</sup>)**

Field size (ac)	Distance from field (ft)									
	100	200	300	400	500	600	700	800	900	1000
<b>Two days after application</b>										
74.4	391	322.1	269.7	234.3	204.9	181.1	159.6	141.65	128.38	116.42
58.5	416.8	323.36	271.05	226.9	194.2	173.3	157.4	141.8	127.15	115
38.3	284.94	222.4	178.24	150.44	126.14	109	94.352	83.356	75.908	70.27
27.8	313.1	236.1	185.36	154.2	133.12	118.65	103.15	92.089	80.576	71.69
18.6 a	264.62	203.84	160.9	132.54	110.68	93.976	81.328	71.24	63.25	55.406
18.6 b	266.2	207.6	163.93	136.26	114.28	94.98	81.57	70.394	62.424	55.235
11.3 a	225.4	174.1	134.2	110.04	88.26	73.956	63.306	55.499	49.192	43.58
11.3 b	251.8	193.4	140.3	107.4	86.42	73.4	61.58	51.318	44.792	37.864
5.74 a	149.1	109.5	83.397	59.244	46.407	39.109	33.535	29.2	25.448	21.83
5.74 b	146.5	107.7	79.64	59.67	47.074	38.52	32.015	27.62	24.578	21.48
<b>Three days after application</b>										
74.4	391.7	314.5	262.4	226.6	195.2	174.4	154	139.1	126.75	115.415
58.8	330.6	261.3	221.45	190.7	169.55	149.7	133.4	119.6	108.4	99.012
38.3	301.98	240.9	198.98	164.1	138.78	119.32	98.926	87.324	79.664	71.763
27.8	285	226.8	188.67	160.58	133.74	117.05	100.428	87.486	78.598	70.95
18.6 a	252.76	196.96	156.7	121.36	99.756	84.944	72.4	62.15	53.138	48.102
18.6 b	224.855	173.15	139.09	109.36	89.576	76.355	64.158	55.692	49.75	44.972
11.3 a	198	145.5	111.2	88.806	70.44	58.208	49	40.921	36.252	32.083
11.3 b	226.1	166.3	125.2	99.08	79.15	64.35	51.902	43.446	38.402	33.512
5.74 a	139.8	93.395	70.875	54.501	45.065	37.714	32.91	28.134	23.678	20.871
5.74 b	117.5	81.03	59.34	45.16	36.128	29.777	25.291	22.56	20.11	17.388